

Chapter 7

Technology and Preservation Policy

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Technology and Preservation Policy

INTRODUCTION

The Federal Government, "in cooperation with other nations and in partnership with States, local governments, Indian tribes, and private organizations and individuals, " is responsible for providing leadership in preserving U.S. prehistoric and historic cultural resources.¹ The National Historic Preservation Act charges the Secretary of the Interior and the Advisory Council on Historic Preservation with administering and guiding the overall Federal preservation effort.

Participants in the OTA workshops asserted their belief that the Federal Government must continue to play the primary role in: 1) encouraging and supporting prehistoric and historic preservation; and 2) guiding the Federal agencies, as well as State and local governments, in conserving the Nation's cultural heritage. Through passing the several preservation laws (see app. A) as well as establishing and maintaining the Historic Preservation Fund (HPF), Congress has assumed the responsibility for formulating national historic preservation policy and providing the framework and means to carry it out. All Federal agencies are required by law to preserve prehistoric and historic properties on lands under their jurisdiction,² and each could become involved in developing relevant preservation technologies.

The National Historic Preservation Act, enacted in 1966 and amended in 1976 and 1980, gave the Federal Government the funding and authority to bring greater consistency and coordination to a multidisciplinary and multidirectional field. The mechanism enabled by this legislation ties together the national, State, and sub-State governmental levels and includes, among other components:

- The National Park Service's (NPS) Cultural Programs (see app. F) manage the National Register of Historic Places, administer the

Historic Preservation Fund, provide technical assistance to Federal, State, and local agencies and the public on identifying, evaluating and protecting cultural resources; and develops historic preservation standards, guidelines, and regulations, which are promulgated by the Secretary of the Interior. NPS also manages most of the nationally significant prehistoric and historic sites in the United States.

- The Advisory Council on Historic Preservation "advise[s] the President and Congress on matters relating to historic preservation, recommends] measures to coordinate activities of Federal, state, and local agencies and private institutions relating to historic preservation."³ It also "review[s] the policies and programs of Federal Agencies."⁴ In particular, it is charged with encouraging public interest and participation in historic preservation, recommending studies, advising on legislation, encouraging training and education, recommending methods to improve Federal agency programs, and providing information on the Council's activities. The Council reviews and advises on projects undertaken or permitted by Federal agencies that may affect properties listed on or eligible for listing on the National Register of Historic Places (see app. F).
- The State Historic Preservation Offices (SHPOs) and Certified Local Governments (CLGs) receive yearly HPF matching grants to ensure that State, regional, and community preservation projects are carried out according to the nationally accepted standards developed within NPS cultural programs. Pursuant to the National Historic Preservation Act, the Governor of each State designates a State Historic Preservation Officer to administer preservation programs in

¹ National Historic Preservation Act, Section 2 (2).

²See especially, the National Historic Preservation Act, Sections 106 and 110.

³National Historic Preservation Act, Section 202 (a)(-).

⁴National Historic Preservation Act, Section 202 (a)(6).

that State. CLGs are approved by States and receive funding from them.

- The National Trust for Historic Preservation, chartered by Congress in 1949,⁵ has, since passage of the 1966 legislation, received a portion of its funding through annual grants from the Department of the Interior and, thus, has also been incorporated into the

U.S. preservation mechanism. The Trust fosters public participation in historic preservation, and provides preservation information. It also owns and manages certain historic properties (see app. H).

⁵National Trust Act of 1949 (Public Law 81-408, 63 Stat. 937).

FEDERAL POLICY

Previous chapters have identified a range of issues related to the use of technologies for prehistoric and historic preservation. This chapter relates these issues to Federal preservation policy and suggests options for implementing current policy. In certain critical preservation areas, this chapter also presents possible new policy directions.

The Federal Preservation Budget

The future use of technologies for historic preservation is threatened by declining funding. Pessimism over the declining Federal budget (figure 4) for preservation suffused OTA's five workshops. Workshop participants noted that the un-

certainty over the amount and focus of Federal support for historic preservation programs bears directly on historic preservation technologies and could drive needed specialists away from the field. The eventual lack of expertise could jeopardize:

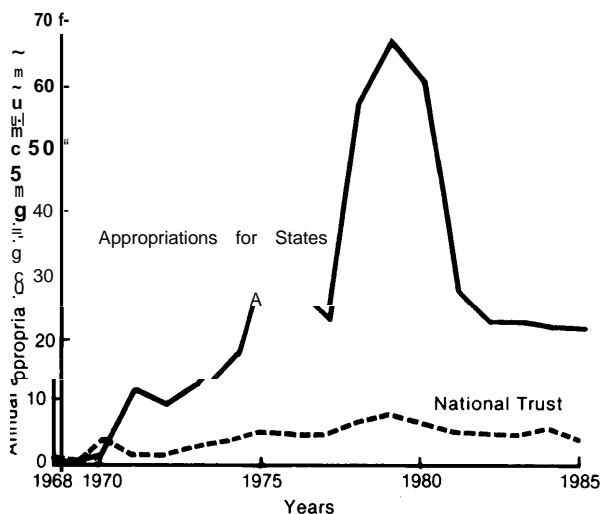
- Federal agencies' ability to identify, evaluate, and protect prehistoric and historic properties affected by their actions or under their control; and
- the quality of future restoration and rehabilitation, much of which is conducted outside the Federal preservation tax incentives program without the benefit or intervention of competent preservationists.

Most OTA workshop participants viewed the continuance of vigorous Federal involvement in prehistoric and historic preservation crucial to the aims of preservation. They voiced fears over the future of SHPOs and CLGs if the Federal Government retreats further in support of their programs.

In their view, budget reductions weaken the Federal Government's traditional leadership in advancing preservation. SHPOs match 50 percent of the grants received from the HPF. They pass on 10 percent of that amount to CLGs. For each of the last 6 years, in the interest of returning more authority over preservation funding to the States, the Administration has cut funding from the HPF for the States. Each year, Congress has restored such funds; the annual appropriation for historic preservation has declined steadily in that time.

Nevertheless, interest in preservation has increased nationwide. This increase, which has been dramatic since 1980, began in 1976, when

Figure 4.—Annual Historic Preservation Fund Fiscal Appropriations



SOURCE: National Conference of State Historic Preservation Officers.

tax incentives for rehabilitation became available to owners of income-producing certified historic buildings.⁶ Taxpayers reported rehabilitation expenditures of \$635.5 million for 1982 and \$1,201.2 million for 1983, for certified historic structures alone.⁷

Increased preservation activity has necessitated increased technical assistance from the Federal Government, which administers the Tax Act Rehabilitation Certification Program through NPS and the Internal Revenue Service. The Federal Government has provided that help through NPS's Preservation Assistance Division. Ironically, the budget for their efforts has been reduced precisely during the time of greatest historic building rehabilitation activity. (See app. F for a brief description of NPS cultural resource activities.)

Both professional and nonprofessional preservationists have relied heavily on the Division's technical publications for protecting historic buildings. These publications, in the form of briefs, "tech notes," case studies, booklets, and reports, contain technical information concerning sound and carefully tested approaches to analyzing and resolving problems in historic structures.

Applying Technology to Prehistoric and Historic Preservation

Because of the Federal Government's traditional leadership role in prehistoric and historic preservation, and in developing advanced technologies for applications in many different other fields, effective use of technologies will require their continued involvement and support. The greatest single need is to improve the transfer and adaptation of technologies from other disciplines into preservation.

Technology transfer is the process of applying technology developed for one technical, geographical, or institutional area in another. Because most advanced technologies used in preservation were originally developed for use in

different technical or scientific settings, considerable effort must often be exerted to apply them to the conditions prevalent in preservation. Research, training, information sharing, and development of standards are essential ingredients in this process. It is important for all Federal managers to be fully aware of the potential that cost-effective new technology holds for solving problems in the field, contributing to more effective care of cultural resources, and in analyzing and balancing the claims of competing interests.

Federal agencies provide a variety of means for encouraging and facilitating the use of new preservation technologies. One important mechanism is the government contracting mechanism, by which the Federal Government purchases services of preservation professionals. **When contracting with private firms or universities for preservation work, the agencies could encourage the use of certain technologies or approaches that have demonstrated a potential for cutting costs and maintaining preservation standards.** All relevant disciplines should be reflected in the Requests for Proposals (RFPs). For example, RFPs should always include specific mention of the historical and geological context of archaeological sites, or the historic context within which each historic structure or landscape is assessed, assigned value or significance, and treated.

Because the Federal Government coordinates its activities with the State Historic Preservation Offices, technological applications will eventually be transferred to the States and to local communities. However, lack of coordination among agencies, funding conflicts, and institutional apathy have slowed the adoption and widespread use of advanced techniques for preservation applications. The following paragraphs examine a variety of policy options by which the Federal Government can encourage and advance the applications of technology for prehistoric and historic preservation.

Policy Options

Establish a Federal Center for Preservation Technology

There is no central facility within which individuals or organizations can obtain assistance

⁶"Information on Historic Preservation Tax Incentives" GGD-84-47 (Washington, DC: General Accounting Office, Mar. 29, 1984).

⁷"Tax Policy and Administration: Historic Preservation Tax Incentives," GGD-86-1 12FS (Washington, DC: General Accounting Office, August 1986), table II.6.

with technological problems relating to preservation. However, a central laboratory could bring together professionals from a number of disciplines to tackle preservation problems from all major areas—archaeology, historic structures, and historic landscapes. Such an institution would also function as a clearinghouse for sharing information among the various components of the preservation community.

The U.S. Government maintains a number of Federal or federally supported laboratories for research in climate, energy, weapons, and other areas of national concern. One or more university or Federal laboratory could be funded to provide sustained support for preservation research, as well as a variety of necessary services such as remote sensing, photogrammetric recording, or materials failure analysis.

Congress could direct the Secretary of the Interior to establish such a center within the Department of the Interior or some other Federal agency. The center would facilitate the transfer of technology from other areas into prehistoric and historic preservation by watching for and adopting new applications of existing technology, providing training for preservation professionals, and disseminating information on preservation technologies. In addition to meeting Federal Government requirements for preservation technologies, such a center would also serve State and local needs. It would:

Conduct Research on Preservation Problems.

It would either assume responsibility for the research programs related to historic preservation or coordinate with and supplement current programs. A center should have a small, highly trained staff and the facilities for testing and analyzing new methods, techniques, and equipment.

Such research could be carried out in a variety of agencies and institutions possessing specialized expertise in technical areas, but should be coordinated by a single agency focusing specifically on historic preservation. Several government agencies already provide some important technical services related to preservation needs:

- The National Bureau of Standards Center for Building Technology is the Nation's only integrated building research laboratory that

studies and tests a variety of building materials, including adobe. It maintains contact with State agencies through such groups as the National Conference of States on Building Codes and Standards and numerous professional societies dedicated to building and construction technologies, such as the National Institute of Building Sciences.

- The National Science Foundation (NSF) Archaeometry Program provides limited funding for the development of new techniques in archaeological science.
- The National Aeronautics and Space Administration (NASA) Remote Sensing Applications program provides some training and limited support for the developing archaeological and landscape applications of remote sensing from aircraft and spacecraft.
- The Department of Defense, through the Navy, funds the projects conducted by oceanographic institutes whose activities and technologies often bear on historic preservation. For example, the Navy and NSF (through its Marine Sciences Division) helped fund the Woods Hole Oceanographic Institution's Deep Submergence Program to document the Titanic.
- The National Oceanic and Atmospheric Administration, which, with technical advice from the National Trust for Historic Preservation and NPS, is documenting the U.S.S. *Monitor*.

Set Standards and Provide Training.—Although such programs are conducting high-quality research in prehistoric and historic preservation, they are not equipped to set standards or to provide the training that is essential to the efficient transfer of technology. As noted in chapter 2, there is a strong need for an institution that would identify research and development requirements, design preservation standards, disseminate information on new methods, and train professionals in the use of appropriate new technologies.

Because it is the largest single purchaser of preservation materials and services, the government would benefit directly from the increased expertise such training would provide. Training programs in historic techniques, similar to those offered by RESTORE, a New York-based nonprofit

organization that provides training for tradespeople in the restoration and maintenance of historic buildings, should also be considered. In order for Federal managers to contribute to more effective management of historic properties, including landscapes as well as structures, it is essential that they become properly trained in the potential for new technologies to aid in the preservation process.

There is a strong need for workshops or seminars on techniques for historic preservation that include experts from many different disciplines. Many new methods, techniques, and kinds of equipment for historic preservation derive from natural science and engineering fields. Many cultural resource managers were trained in humanistic disciplines and may not be aware of the potential for new technology to solve historic preservation problems. A Federal center could aid this effort by providing direct funding for such seminars, and by encouraging professional organizations to provide the aegis for them. a

Collect and Disseminate Information About Technologies for Preservation.—Detailed summaries on the technologies available for archaeological sites, historic structures,⁹ and historic landscapes, and their benefits and drawbacks, could help reduce costs for preservation and result in more effective research. To be most useful, these documents should also provide an inventory of sources of expertise within the field. In addition to developing a set of documents, a center should make such information available on-line, where it can be brought up to date periodically.

A national center would have the advantage of aggregating much of the specialized technological expertise now spread throughout the Department of the Interior and other Federal agencies. In addition to serving as the focal point for technology-related preservation information within

the Federal Government, such an institution would provide needed assistance to State and local governments and to the private sector.

Establish a National Center for Preservation Technology

Alternatively, Congress could create a National Center for Preservation Technology, managed by a consortium of universities. Such an institution would be able to draw on a multitude of different skills in several universities, and in many university departments. Like the Federal center, it would serve as a focal point for the development and promulgation of preservation technology. It would, for example, also coordinate with the government agencies now responsible for research on different aspects of preservation technologies. However, because it would be free of many of the constraints imposed by being housed within the Department of the Interior, where other departmental funding and policy priorities can impede the development of new technologies, it might be more innovative than a Federal center. Though it would function primarily as a resource for the Federal Government, it would also serve State and local needs.

The National Astronomical Observatories, which are managed by the Association of Universities for Research in Astronomy (AURA) and funded by the NSF, might serve as an appropriate model for such an institution. Located in Tucson, Arizona, and in Cerro Tololo, Chile, they provide research facilities for the entire astronomical community, and also conduct their own research.

Because a national center based in the university community would support Federal preservation efforts, it would receive considerable Federal funding. However, it could also strengthen public/private ties for prehistoric and historic preservation. Such arrangements have always been an important feature of the preservation movement. Thus, a significant percentage of the funding could come from State and *private* sources.

Create a Preservation Technology Board

Additionally, Congress might wish to consider supporting a preservation technology board. Even

⁹The Army Corps of Engineers helped to sponsor a day-long workshop on Microcomputers in Archaeology at the 1986 Annual Meeting of the Society for American Archaeology. This workshop, which was extremely well attended, provided first-hand training for archaeologists in computer techniques for archaeology. Many of the programs exhibited there would be of utility for landscape preservation as well.

⁹NPS has published a very effective series of reports on technologies for historic structures (e.g., *Preservation Briefs*, *Tech Notes*).

if one of the two options for creating a center for preservation technology were adopted, a board composed of professionals from all parts of the preservation community would be needed to provide external guidance to a center and to determine current needs for preservation technology, develop standards for the application of new technologies, and aid in disseminating information. The professional societies with an interest in archaeology, historic structures, and historic landscapes should have considerable interest in such a board.

Preservation efforts within the Federal agencies would benefit by a preservation technology board, which would serve to provide technical standards and information for the entire preservation community. Congress could foster the creation of such an organization by encouraging the Federal agencies with major responsibilities for prehistoric and historic preservation to provide its initial funding. A board could also foster the public/private partnership in preservation.

Federal Management of Prehistoric and Historic Cultural Resources

The Federal Government's prehistoric and historic preservation programs lack an effective central focus. Many participants in OTA's workshops expressed considerable concern over the lack of a central agency or framework for supporting technological applications for historic preservation. Given no effective central focus, it is difficult to set technical standards, provide coordination, and continuity among Federal agencies.

NPS could pursue this task by expanding its present core of experts and information on archaeology, historic structures, and historic landscapes. However, with the current institutional structure for preservation within the Department of the Interior, cultural programs do not get the attention they merit.

It would be possible to place cultural programs within a framework modeled on the European cultural ministry. The National Historic Preservation Act itself was produced after study of the European cultural ministerial experience, which in France goes back 150 years. While some Euro-

pean cultural resource management is significantly regionalized, as in West Germany and Italy, the central ministry nevertheless performs vital coordinative and support functions.

Since its establishment in 1916, NPS has been the foremost Federal agency for historic preservation, and despite the lack of strong Administration support for preservation (compared to other priorities), and limited budgets, carries out many excellent programs such as the Historic American Buildings Survey (HABS) and the Historic American Engineering Record (HAER).

Because NPS falls under the jurisdiction of the Assistant Secretary for Fish and Wildlife and Parks, some observers have voiced considerable skepticism as to whether it could ever bring cultural concerns to the forefront of the Department of the Interior's conservation agenda. The energies of Fish and wildlife and Parks are directed largely toward natural environmental, energy, and other pressing land management issues. On the other hand, a director sympathetic to and deeply aware of the importance of the Federal role in historic preservation could exert the influence necessary to change the current balance. Furthermore, NPS itself is the owner and manager of the largest collection of historic properties in the United States and has special expertise in managing them.

The Advisory Council on Historic Preservation and The National Trust for Historic Preservation also provide technical advice to the Federal agencies and the public at large. A renewed Federal commitment to historic preservation, with more efficient and effective use of preservation technologies, will require these organizations to coordinate their efforts more closely. In addition, more involvement is needed with the National Building Museum in Washington, DC, chartered by Congress in the National Historic Preservation Act, Amendments of 1980 (see app. I). The Building Museum, because of its public/private nature, could play an especially informative and helpful part in advancing the understanding of building technologies and their role in preservation.

The preceding discussion raises issues that are outside the scope of this study. Yet they are serious enough to suggest further detailed study. Congress may wish to consider changes in the structure of the Federal Government's preserva-

tion efforts.¹⁰ Participants in the OTA workshop and review process suggested several different options:

Establish a Separate Agency To Manage All Federal Cultural Programs

In addition to providing a central focus for all government programs in preservation, such an agency would be responsible for administering the National Endowment for the Humanities, the National Endowment for the Arts, and other culturally oriented programs.

Create an Independent Agency Devoted to the Care and Protection of Prehistoric and Historic Cultural Resources

Such a policy has the major advantage of providing coherence for the management of U.S. prehistoric and historic preservation programs. It would remove the primary responsibility for cultural resources management from the Department of the Interior, yet it would create a new institution that must be staffed and funded. An independent agency would be the logical place for a Federal center for preservation technology. However, it would lack the benefits of in-house expertise in the actual ownership and management of historic properties, including landscapes.

Reorganize the Department of the Interior To Provide for an Assistant Secretary for Natural and Cultural Resources

This option would bring all the cultural programs from NPS and other Interior agencies under the aegis of one office. It would be simpler to effect than creating an independent agency, and would increase the visibility and importance of preservation within the Department of the interior. However, it would continue the current situation of maintaining the preservation function within the Department which, as noted earlier, has disadvantages as well as advantages for the national preservation programs.

¹⁰The Advisory Council on Historic Preservation has just completed a study that treats issues related to the overall Federal preservation effort: *The National Historic Preservation Act: An Assessment* (Washington, DC: Advisory Council on Historic Preservation, September 1986). In addition, see *The Secretary of the Interior's Twentieth Anniversary Report on the National Historic Preservation Act* (The Section 504 Report).

Work Within the Current Preservation Structure

Even if the management structure for Federal preservation were left largely unaltered, there are a number of improvements to this Nation's preservation effort which are possible, given the direction provided by the National Historic Preservation Act, and other legislation. The initiation and execution of such programs will require direction and continued oversight by Congress.

The agencies could:

Inventory Their Preservation Needs and Plans for implementing Them.—Each Federal agency has a different set of requirements for the preservation and protection of cultural resources. Each agency could be directed to make a periodic inventory of its overall cultural resources preservation needs, and report them to Congress. Such an inventory would help the agencies and Congress assess where additional attention should be applied to preservation. Cultural resources protection (see Chapter 4: *Restoration, Conservation, Maintenance, and Protection*), especially, could improve markedly if it had a higher priority within the Federal agencies, and if the agencies made stronger attempts to coordinate with one another as required by the Historic Preservation Act (Section 110).

Develop Sustained, Organized Maintenance Programs for Historic Federal Properties.—Except for catastrophic events, most deterioration from environmental processes can be slowed or mitigated by systematic, regular maintenance. Yet, most agencies have inadequate maintenance programs for their tangible cultural resources and tend to respond to preservation crises instead. **The Federal agencies could improve their programs for prehistoric and historic protection by instituting well-organized procedures of systematic and regular maintenance on the properties under their management and control.**

Improve Coordination and Information-Sharing Among Agencies With Respect to Historic Preservation.—The technologies for prehistoric and historic preservation are not generally integrated with larger government systems and programs. For example, the maintenance considerations appropriate to historic buildings

are not integrated with modern building maintenance and conservation practices. Archaeological information is seldom part of an overall land management and environmental program. To date, concerns for soil erosion, forest management, game laws, and archaeological sites are isolated. Even where the data are accurate and included in geographical information systems, they are not exploited to monitor change or develop protection policies.

Develop a Stronger Focus on the Application of New, Efficient Technologies for Preservation.—In coordination with a national preservation technology board, which Federal agencies could help initiate, the Federal agencies most concerned with historic preservation could focus more of their funding and other resources on the development of technologies for historic preservation. **Among such efforts should be the development of a central database for critically evaluated technical preservation information, and sustained funding for university laboratories that support the effort to develop new preservation technologies.**

Establish a Central Office To Collect and Disseminate Information About Preservation Technologies.—It would be most appropriate for NPS to assume the leadership in collecting and disseminating technical information because an important part of its mission is to provide information and training for preserving the Nation's cultural resources. * This information should eventually be placed "on-line," where it can be routinely updated. Other Federal agencies besides those within the Department of the Interior could aid in the collection and dissemination of information by contributing structural preservation and maintenance, as well as archaeological reports, completed under contract to State and Federal governments. As noted in Chapter 5: *Preservation Information*, NPS is now developing a database that will include most of these reports (the so-called "grey literature"). This database will be extremely important to future studies. However, not only should there be a listing of such

grey literature, hard copies should be stored where qualified individuals can obtain them. * *

In general, OTA workshop participants felt that the Federal Government should take **a leading role in developing databases and archives for preservation**. In doing so, it should include information from all relevant disciplines. For example, the historians are concerned about the lack of historical expertise among archaeologists. Because most sites, even prehistoric ones, have been affected by historical incidents, information concerning the history of an area is often extremely important in archaeology.¹¹ Such a database would enable the sharing of information among Federal agencies.

Federal Policy for Looting, Vandalism, and Illicit Trade in Cultural Resources

Looting and vandalism are extremely serious stresses to prehistoric and historic cultural resources. They are particularly damaging to prehistoric sites. In order to stem the theft of artifacts from public lands, **the United States needs a consistent national policy for dealing with illicit excavation and trafficking in stolen artifacts**. Because the needs and resources of each major region of the country are different, such a policy should provide for regional implementation.

To assist in stemming the illegal loss of irreplaceable artifacts from public lands, and the concomitant damage that looting causes, Congress may wish to amend the Archaeological Resources Protection Act of 1979 **and other statutes to permit private registration of antiquities obtained in the course of archaeological excavations on private land, conducted by trained archaeologists (see app. C for one such proposal)**. Such antiquities should be registered with a State or local agency. Registration information should include sufficient information about each artifact

*NPS has discussed the desirability of issuing a technical brief in which the various technologies are described and sources of information and expertise supplied. However, it has not yet produced such a report.

**Because they may contain sensitive information, not all such reports should be broadly available. Potential users should be screened by the SHPOs.

¹¹I see, for example, *The River of Sorrows: The History of the Lower Do/ores River Valley* (Denver, CO: Department of the Interior Bureau of Reclamation and National Park Service, no date) for a historical study of an area about to be inundated. The area was the site of an intensive archaeological survey and salvage study.

to allow the owner to understand its archaeological origins and connection to the prehistoric peoples from which it derives. Registration would allow archaeologists and others to locate artifacts for research purposes. The availability of micro-computer systems makes the maintenance of a registry in each State much less costly and much easier than it might have been only a few years ago.

Registration of scientifically excavated artifacts is likely to enhance the value of registered artifacts relative to unregistered ones. Such increase in value might provide economic incentives for private landowners to have their sites properly excavated and recorded, rather than dug solely for their marketable artifacts. Registration might also assist in educating landowners to the scientific value of using the best possible excavation methods. However, sale of artifacts from excavations would have the disadvantage of dispersing some collections, which would reduce the ability to restudy them.

The Convention on Cultural Property Implementation Act¹² (see box D) prohibits importation of stolen cultural property that is documented as belonging to the inventory of a public monument, museum, or similar institution in a State party to the UNESCO Convention on the Means of Prohibiting and Preventing the Illicit Import, Export and Transfer of Ownership of Cultural Property.¹³ It also restricts importation of archaeological or ethnological materials from other countries on request and subsequent agreement by the United States. However, it is just being implemented and further experience will be needed to test its efficacy in stemming the international flow of cultural property.

U.S. law does not protect against export of irreplaceable items of this country's history from the United States to other countries. The UNESCO Convention encourages each State party to register cultural property¹⁴ for the purposes of controlling import into other countries. As experience is gained in implementing the Convention on Cultural Property Implementation Act, to explore

60X D.—Convention on Cultural Property Implementation Act (Public Law 97-446)

This act implements the 1970 UNESCO Convention on the Means of Prohibiting and Preventing the Illicit Import, Export and Transfer of Ownership of Cultural Property, which has now been signed by 58 countries, including the United States.¹ Two enforcement mechanisms are available:

1. At the Request of a State party, Imposes U.S. Import Restrictions to Protect Endangered Archaeological and Ethnological Materials (Article 9): it establishes a mechanism whereby the President may enter a bilateral or multilateral agreement or take unilateral emergency action to protect, through the imposition of U.S. import restrictions, archaeological or ethnological materials that are part of a country's cultural patrimony and are in danger from pillage. Each request for import restrictions from a State Party is reviewed by the Cultural Property Advisory Committee which makes recommendations to the President, or his designee, as to whether restrictions should be imposed.

A list of materials that are denied entry into the United States under this provision is published by the U.S. Commissioner of Customs. No such lists have been published to date. However, in October 1985, the Government of Canada asked the United States to impose import restrictions to protect endangered Canadian archaeological and ethnological material. The Canadian request is under consideration.²

- II. prohibits Entry of Stolen Cultural Property (Article 7(b)): Any article of stolen cultural property documented as belonging to the inventory of a public monument, museum, or similar institution located in a State Party is prohibited importation into the United States after April 12, 1983 (or the date the State Party implemented the Convention, whichever date is later). The U.S. Customs Service is responsible for enforcements

¹See Maria Papangeorge Kouroupas and Ann J. Guthrie, "The Cultural Property Act: What It Means for Museums," *Museum News*, June 1985.

²See "Canada Submits Request for Cultural Property Protection," *USIA Word*, December 1985, p. 12.

³Quoted from "Information on U.S. Assistance Under the Convention on Cultural Property Implementation Act," "Synopsis," Washington, DC: United States Information Agency, January 1986.

¹²Public Law 97-446.

¹³Fifty-eight countries have signed the UNESCO Convention.

¹⁴See Articles 6 and 10 of the Convention.

ways in which the registration of artifacts suggested above could be expanded to other prehistoric and historic cultural property.

Improvement of the protection of endangered sites, structures, and landscapes will require more personnel trained in cultural resources law enforcement. It is also important to make law-enforcement work schedules more flexible to allow for patrols during the evenings, weekends, and holidays. In addition, because looters and vandals have access to advanced technology, including sophisticated radios and detection systems, law-enforcement personnel should be well-equipped to detect and apprehend them. In some cases, especially in the West and Southwest, some agencies do not always serve as effective role models in their treatment of cultural resources. If agency personnel are perceived as not caring about protecting cultural resources, local residents can hardly be expected to understand the need for treating them with respect.

Federal Education Programs

Federal managers are often hard pressed to carry out their responsibilities in geographical areas where citizens may not fully appreciate both the cultural and economic importance of preserving prehistoric and historic resources. Strengthening Federal, State, and local educational and interpretive programs appears to be a cost-effective way to improve the protection of archaeological sites, historic structures, and landscapes. Archaeology and historic structures and landscapes have a natural appeal for the public. Preservationists outside the Federal Government could aid Federal agencies in their tasks by informing Members of Congress, and officials of Federal agencies, State, and local governments, of the importance of historic preservation in their communities.

The following options suggest several ways in which citizen awareness of the value and importance of preservation could be improved.

Popularizing Preservation/Protection Issues on Federal, State, and Local Levels, Including Industry

This can be accomplished, at least in part, by:

- Publicly recognizing the positive actions that various organizations, including private ones, have taken to raise the consciousness of the public. The Historic Preservation Act (Section 110 (h)) provides for an annual preservation awards program. Increasing the visibility of this awards program would help popularize protection concerns.
- Educating Congress, the Administration, Governors, and the State Attorneys General about the extent and importance of preservation/protection problem.

Like the general public, many public officials are unaware of how many cultural resources the United States has lost, as well as their importance to research. As a result such officials may not give sufficient attention to the problems caused by looting and vandalism. The "Take Pride in America" campaign, initiated by the Secretary of the Interior, should help focus the attention of public officials and other citizens on the importance of maintaining our prehistoric and historic cultural resources.

Strengthening the Implementation of the Archaeological Resources Protection Act (ARPA)

ARPA has been only marginally effective in stemming the losses of archaeological resources. Yet, unless prosecutions are pursued vigorously the positive effects of applying law enforcement technology will be lost. One way to strengthen ARPA's effectiveness is to improve the educational programs for law enforcement officers by giving thorough training in ARPA's provisions and regulations.¹⁵

¹⁵ Final Uniform Regulations, Archaeological Resources Protection Act of 1979, "Federal Register 49, No. 4, Jan. 6, 1984.

In addition to training agency law enforcement personnel, the Federal Government should institute more courses **such** as those given by the Federal Law Enforcement Training Service institute in Atlanta, Georgia, to train Federal and State judges and prosecutors about the nature of cultural resources and the laws protecting them.¹⁶ Improved cooperation among Federal agencies in training programs would enhance the ability of officers in each agency to carry out their duties with respect to the protection of cultural resources. Such interagency training should include training on methods to combat the use of technology by looters, who have begun to employ sophisticated methods to find archaeological resources and to avoid detection by law enforcement officials.

Some regions have organized interagency training workshops.¹⁷ but ~~they~~ **tend** to be ad hoc, and highly dependent on the particular mix of personnel available in a region. Such training should be held on a regular basis and should be as independent as possible of the interests of particular individuals.

Support Avocational Interests

A variety of privately funded programs now exist to support the interests of individuals in archaeology and historic preservation. The agencies could make better use of such programs to support Federal programs by helping such groups pursue their interests. Often, rather than supporting those with avocational interests in preservation activities, agency personnel perceive them as increasing their workloads vis-a-vis supervision

¹⁶Therecentlaw enforcement efforts in Southeast Utah in which hundreds of Anasazi pots, allegedly dug up from public lands, were seized in Federal raids is a good example of what can be done if law enforcement efforts are well-coordinated and carried out with the cooperation of local, State, and Federal agencies. Jim Robbins "The Great Artifact Grab," *Chicago Tribune Magazine*, Aug. 10, 1986,

¹⁷Forexample, the N PS Southwest Regional Office held a protection workshop in May 1986 that included Federal officials from NPS, the Forest Service, the Bureau of Indian Affairs, and the Bureau of Land Management.

and granting permits. Yet, these and other interested groups can be extremely effective in helping to focus local public opinion toward protection of prehistoric and historic sites.

Underwater Archaeology

The United States lacks an effective national policy regarding the protection of prehistoric and historic submerged and maritime resources. Even with the passage of the Submerged Lands Act of 1953, by which the Federal Government granted the States title to the lands and natural resources within 3 miles of their coastlines, historic shipwrecks and other submerged cultural resources within those limits of U.S. territorial waters are vulnerable to the work of salvagers, few of whom are attentive to the appropriate preservation of historic shipwrecks. Many are well-financed and equipped with the latest marine technologies for locating and recovering materials from the deep.

All Federal agencies are required by law to preserve prehistoric and historic properties on lands and under waters within their jurisdictions, but several have major roles in managing underwater cultural resources (table 18)¹⁸ They can provide a variety of means for encouraging and facilitating the uses of new technologies in underwater archaeology and maritime preservation. This area of preservation has been an extremely neglected element of the Nation's cultural resource base.

Current national preservation policy is weak and fragmented with respect to maritime and submerged cultural resources, particularly historic shipwrecks. The various existing cultural resource laws, supporting regulations, standards, and guidelines attendant to the Federal, State, and local governmental preservation efforts are not being applied with equal fervor to submerged cultural resources. In part this is the result of the fact that no single Federal department or agency has been

¹⁸National Historic Preservation Act, Amendments of 1980, Section 110.

Table 18.—Federal Agencies With Major Roles in Underwater Archaeology and Maritime Preservation

Advisory Council on Historic Preservation
Bureau of Land Management (DOI)
Bureau of Reclamation (DOI)
Environmental Protection Agency
Fish and Wildlife Service (DOI)
National Forest Service (DOI)
National Oceanic and Atmospheric Administration (DOC)
National Park Service (DOI)
U.S. Army Corps of Engineers (DOD)
U.S. Geological Survey (DOI)
U.S. Navy (DOD)

charged with coordinating and directing a strong, visible national program for maritime preservation.

The first criteria for evaluating and nominating shipwrecks to National Register were finally written in November of 1985 nearly 20 years after enactment of the Historic Preservation Act of 1966. Even though Federal agencies are required under the several historic preservation laws to consider the treatment of cultural resources in their overall planning, few acknowledge or exhibit sufficient awareness of submerged cultural resources.¹⁹

The following statistics demonstrate the long-standing lack of attention to underwater and other maritime cultural resources, even within historic preservation:²⁰

- Of the more than 45,000 buildings, objects, and sites listed in the National Register of Historic Places, only 120 are ships.
- The Historic American Buildings Survey (HABS) has recorded thousands of buildings and other structures as well as documents and photographs in 53 years. However, the Historic American Merchant Marine Survey (HAMMS) was dissolved only 18 months after its inception during the New Deal in 1937. Thus, the opportunity to record perhaps thousands of ships and other vessels was lost.

¹⁹Exceptions are the National Park Service, which maintains a Submerged Cultural Resource Unit in Santa Fe, NM, and the National Oceanic and Atmospheric Administration, which is in charge of the Federal effort to preserve the Monitor.

²⁰Editor's Column, "Listing Ships," *Preservation News*, June 1986.

- In 1979 the Department of the Interior issued standards and guidelines for the rehabilitation of historic buildings.²¹ These standards have stimulated more than 9,000 privately funded rehabilitation projects carried out with tax incentives. No such standards exist for ship restoration.
- The rehabilitation of historic buildings using tax incentives has reached billions of dollars since 1976. No such incentives exist to attract private dollars to ships.
- Nearly every State has surveyed some portions of historic resources and nominated thousands of properties to the National Register. However, few States have begun to survey their submerged cultural resources.
- Confusion over National Register of Historic Places qualifying criteria for listing may have excluded many ships from that roster. Register guidelines state that siting is critical in assessing the integrity of historic structures. However, ships and other vessels move or are buried. Present Register criteria are too "building specific."

Recent legislative initiatives may signal greater attention to underwater archaeology and maritime preservation. The Senate Committee Report to the Fiscal 1985 Act Providing Appropriations for the Department of Interior and Related Agencies²² stipulated that NPS, with the National Trust for Historic Preservation and the maritime constituency:

... review the maritime resources of the Service and recommend the appropriate future role for the Service and for the private sector in preserving those resources; conduct a thematic review of maritime resources and recommend a set of priorities for the preservation of those resources and the appropriate Federal role in addressing those priorities.²³

In addition, the Senate Report (99-397) to the 1987 appropriations bill for the Department of the Interior and Related Agencies adds \$100,000 to the appropriation for the National Trust for

²¹ "Archeology and Historic Preservation; Secretary of the Interior's Standards and Guidelines," 48FR 4416-44742, Sept. 29, 1983.

²²Senate Report 98-578, Aug. 6, 1984, to accompany H.R. 5973.

²³*Ibid.*

Historic Preservation, specifically targeted for maritime preservation.

Federal agencies have been extremely slow to adopt appropriate advanced technologies for the purposes of conducting underwater archaeological research. Underwater archaeology shares with other preservation areas the lack of a strong, defined, visible central focus for technology within the Federal Government.

The Abandoned Shipwrecks Act (H.R. 3558/S. 2569)

Legislation pending in Congress, The Abandoned Shipwrecks Act of 1985 (1-1. R. 3558 and S. 2569) seeks to resolve conflicting claims and court decisions by clarifying State title to historic abandoned shipwrecks. Historic shipwrecks in coastal waters contain a wealth of important information concerning the exploration and settlement of this country. Yet efforts to protect them for research and public interpretation are hampered by current Admiralty Laws, under which historic shipwrecks are treated as abandoned property, whose contents may be recovered by salvors with no legal protection for the historic information they may hold. Admiralty law was inherited from English Common Law and was intended to apply at the time of wrecking to save life and property. Without clear Federal legislation establishing public interest in, and government ownership of historic shipwrecks, these resources will continue to be highly vulnerable. Other nations, such as Cyprus, Australia, Norway, and the Seychelles, have enacted national laws regulating the management of all cultural resources within the waters of their outer continental shelves.²⁴

passage and implementation of the proposed Abandoned Shipwrecks Act could make it possible to preserve significant historic shipwrecks for future generations by ceding jurisdiction, ownership, and oversight of them to the States.

²⁴P. J. O'Keefe, *Current Developments Regarding Regulation of Marine Archaeology Outside Territorial Waters*, University of Sydney; cited by Douglas Shallcross and Anne Giesecke, "The Status of Federal and State Regulation of Underwater Cultural Resources: Lessons of the Treasure Salvors and Cobb Coin Cases," *Underwater Archaeology: The Proceedings of the 14th Conference on Underwater Archaeology*, 1986.

The House Bill as currently written:

- asserts U.S. title and transfers to the State's title to abandoned shipwrecks that are substantially buried or embedded in submerged lands of a State when included in or determined eligible for inclusion in the National Register of Historic Places,
- declares the the law of salvage does not apply to these abandoned shipwrecks,
- specifies that the act will not affect any suit filed before the date of enactment,
- reaffirms Federal ownership of abandoned shipwrecks on Federal lands,
- retains any existing Federal admiralty and salvage law for all shipwrecks not covered by this bill, and
- directs the Advisory Council on Historic Preservation to develop guidelines to assist the States and the Federal Government in carrying out their responsibilities and to allow for noninjurious recreational exploration and private sector salvage of shipwreck sites.

The Senate Bill includes these provisions and additionally:

- finds that cooperative efforts (by finders/salvors, State and Federal agencies, amateur and professional archaeologists, sport divers, and other members of the public and private sectors) must be promoted to locate and protect abandoned historic shipwrecks on, in, or under State submerged lands;
- states that any person engaging in the recovery of a shipwreck which a State asserts title to shall receive reasonable compensation for such recovery.

In order to improve the preservation of underwater cultural resources, it will be necessary to raise the visibility of underwater archaeology within the Federal Government. Not only NPS is involved, but the rest of the Federal establishment as well. There is no underwater archaeologist stationed in Washington, with direct access to the upper levels within the Department of the Interior. Nor is there a designated archaeologist to coordinate with other Federal agencies such as the U.S. Navy and the National Oceanic and Atmospheric Administration. Yet the Federal Government, as it does in other areas of preser-

vation, could provide the leadership in underwater archaeology. It possesses most of the technologies, experts, and funding, but the efforts of its agencies are extremely fragmented and, therefore, uneconomical.

For example, such programs as NPS's Submerged Cultural Resources Unit, headquartered in Santa Fe, New Mexico, could be given much greater support. It has expanded from a team charged with investigating the effects of reservoir waters on archaeological materials in the Southwestern United States, to a group required to study, record, and propose management of shipwrecks throughout the country. It has been instrumental in successfully establishing underwater parks under the management of **NPS** to which various levels of public access for educational purposes is permitted.

The Sanctuary Programs Division of the National Oceanic and Atmospheric Administration, with the cooperation and involvement of the National Trust, manages the U.S.S. Monitor Project, and has incorporated underwater cultural resources concerns in planning for all existing sanctuaries. It has also established a process for designating leisure marine sanctuaries for cultural resources.

Historic Structures

Institutional impediments have slowed the Federal Government's efforts to maintain its own stock of historic structures. The Federal Government is the largest single owner of property and buildings in the country and the largest purchaser of architectural and engineering services. It is, therefore, in a position to exert more influence on historic preservation than any other entity and can provide a variety of means to encourage and allow the use of new technologies for better preservation of historic structures. However, a lack of coordination among its agencies, insufficient funding, and institutional apathy have slowed acceptance and greater use of appropriate new technologies that might ease its preservation burden.

Within the Federal agencies that administer large or numerous tracts of Federal land, serious conflicts may arise over the agency's mission and

fulfillment of historic preservation responsibilities. The U.S. Army, for example, has 10,000 buildings built before 1940 under its control or, about 2 percent of its total stock. However, because the Army is oriented toward new construction and because it believes that the preservation of historic structures is often labor-intensive and, therefore, expensive, it devotes minimal attention to protecting those historic buildings under its stewardship.²⁵

Likewise, the U.S. Postal Service favors new construction to house its increasingly mechanized mail handling operations. The agency argues that its older facilities, some of the most architecturally distinguished and historically significant governmental and civic structures in the country, are inadequate for the volume of mail that must be processed and are uneconomical to maintain. Yet such a view does not take into account the importance of these buildings to the heritage of the United States.

Prehistoric and Historic Landscapes

Although the National Historic Preservation Act contains no impediment to the identification and preservation of landscapes, neither does it specifically mention them.²⁶ **However, not expressly naming historic landscapes as worthy of being preserved allows the agencies to overlook landscape concerns in their preservation programs.** It may be appropriate to amend the National Historic Preservation Act to include explicit reference to landscapes.

One of the major impediments to preserving historic landscapes is the poor state of knowledge of the Nation's prehistoric and historic landscapes. Until recently, little effort has been expended to identify and document significant landscapes, and no comprehensive, centralized listing of significant American landscapes exists.

²⁵At the request of the House Subcommittee on Public Lands, of the Committee on Interior and Insular Affairs, the General Accounting Office is currently conducting a study on Federal management and maintenance of historic buildings.

²⁶For example, see Section 101 (a)(1)(A): "The Secretary of the Interior is authorized to expand and maintain a National Register of Historic Places composed of districts, sites, buildings, structures and objects significant in American history, architecture, archaeology, engineering, and culture."

Even the National Register of Historic Places can provide only a crude list of National Register properties that are related to landscape architecture. Many significant landscapes are either not on the National Register or are classified under other themes, such as structures or districts.

A comprehensive national historic landscape survey would draw together the information we now have on significant landscapes and identify landscapes missed in previous, haphazard efforts. A survey of designated historic landscapes has already been initiated by the Historic Preservation Committee of the American Society of Landscape Architects (ASLA). The National Park Service has endorsed the survey and disseminated the survey form (see app. F) to State Historic Preservation Officers (SHPOs). However, the ALSA survey depends on volunteer support, which, though essential to success of the survey, could lead to inconsistent results. To assist in meeting prehistoric and historic landscape preservation goals, NPS has identified 12 projects for standards and models (app. F). In order for the survey to be consistent and carried out in a timely manner, it will be essential to apply such standards and models uniformly on a nationwide basis at all levels of public and private preservation efforts. The resultant information should be made available through a central clearinghouse on a uniform database.

It is crucial to increase public awareness of historic landscapes if they are to be preserved. Passage of the Olmsted Heritage Landscapes Act of 1985 (Olmsted Act)²⁷ would materially aid the collection of information on all U.S. historic designed Landscapes.²⁸ By focusing attention on the many landscape projects designed by Frederick Law Olmsted and his firms,²⁹ the Olmsted Act would likely increase interest in other, non-Olmsted designed historic landscapes. The bill also calls for NPS to conduct a theme study of

all historic landscapes identifying potential national landmarks.

Several States, including Ohio, Massachusetts, and New Mexico, have made strides in the identification of landscapes. Although their efforts are related to specific, discrete projects, there is hope that such landscape surveys will be institutionalized.

Certain places, landscapes, and outdoor sites are sacred to Native American groups. It is important to include the views of Native Americans when reaching decisions about historic landscapes considered sacred to these peoples. so

The Federal Government could aid in the identification and preservation of significant prehistoric and historic landscapes by clarifying landscape terminology in the National Register, improving interagency information flow, and focusing more attention on landscape preservation.

There are several institutional impediments to the preservation of prehistoric and historic landscapes. One of the primary barriers to identifying and preserving significant landscapes is the lack of consistent terminology. The Historic Preservation Committee of the ASLA has proposed terminology that could be used. Such efforts should be examined carefully and consistent terminology developed and promulgated. It may be appropriate to include landscape terminology in the National Register, to assist the procedure of nominating significant prehistoric and historic landscapes.

in order to improve the preservation of historic landscapes, NPS should focus more consistent attention on landscape preservation in its management of cultural resources, and coordinate landscape policies and programs with other agencies. For example, although NPS has a chief historian, a chief archaeologist, and a chief architectural historian, it has no chief landscape architect. increased attention to landscapes should include emphasis on the role of technologies in preserving them.

²⁷HR 37—see House of Representatives committee on Interior and Insular Affairs Report 99-148, 99th Cong., 1st sess.

²⁸Section 4 of the proposed act directs the Secretary of the Interior ("through the utilization of existing procedures and programs") to "encourage the identification, preservation, and commemoration of historic designed landscapes."

²⁹Over three generations, the Olmsted firm, whose Brookline, MA, office is now a National Historic Site, managed by NPS, designed such parks as Central Park in New York City; Franklin Park in Brookline, MA; and Prospect Park in Brooklyn, NY.

³⁰See, for example, the American Indian Religious Freedom Act of 1978 (Public Law 95-341).

In addition, although NPS is now considering how to preserve its own historic landscapes, it could intensify those efforts.³¹ NPS could also make a greater effort to include consideration of landscapes in its various publications.³² It could also exercise leadership and enhance its own landscape preservation effort by upgrading and highlighting the function of gardening and grounds

³¹ See for example, John Donahue, "Historic Landscaping," *National Park Service CRM Bulletin*, 9, No. 2, 1986, pp. 1,8, which mentions briefly both landscape design considerations and technologies for reproducing historic trees.

³² For example, the *Preservation Brief.. and Tech Notes* published by the NPS Preservation Assistance Division.

maintenance as a crucial resource management role in the service.

Finally, there are no uniform standards for landscape preservation. NPS publications, *National Register of Historic Places Bulletin* 18, "How To Evaluate and Nominate Designed Historic Landscapes," and the NPS Handbook, "Cultural Landscapes: Rural Historic Districts in the National Park System," will assist the effort to develop standards for nomination to the National Register of Historic Places. However, technical standards equivalent to those that have been generated for the built environment are also important and need to be developed for landscapes.

STATE AND LOCAL GOVERNMENTS

As demonstrated from the beginning of the preservation movement, State and local governments, along with private organizations and many individuals, have provided the will and the incentive for preserving significant aspects of this Nation's history. "Because of the diversity of the Nation in which we live, American history is local history."³³ Local residents wish to have a strong hand in preserving their own history. As noted earlier, under the terms of the National Historic Preservation Act, through the State Historic Preservation Offices, States are responsible for a wide variety of preservation activities. Although the technical guidance and support of the Federal Government can assist States' efforts to make more effective use of technologies for preservation, ultimately the impetus must come from within the States,

This section discusses several areas in which the Federal Government may provide specific and direct technical assistance to State and local governments. It also suggests how States may improve their effectiveness in applying technologies to the management and preservation of State and local prehistoric and historic cultural resources.

³³ Marilyn Nickels, National Park service, personal communication, 1986.

State Surveys

Identifying significant prehistoric and historic cultural resources is the first step in preserving them for the education and enjoyment of future generations. State offices should be encouraged to maintain surveys on computer databases so they can be enlarged and corrected frequently and cost effectively (see *Chapter 5: Preservation /formation*, for discussion of State databases). A yearly report to the State legislature detailing that year's efforts might assist in obtaining additional support for statewide work.

Archaeological Resources

In spite of many citizens' long history of interest in collecting Native American artifacts (e.g., projectile points, pipes, carved figures, and pottery), local knowledge of prehistoric sites is often not recorded at the State level. Even many historic archaeological sites are not recorded on State surveys. Recording such resources at the State level would enhance their preservation for research and public interpretation.

Underwater Archaeological Resources

As noted elsewhere in this report, there is a strong need for States to inventory their underwater cultural resources. Even inland States may

possess significant underwater resources in lakes, streams, and rivers.³⁴

Structures

In large part because of the influence of the Historic American Buildings Survey (HABS) and the National Register of Historic Places, many State and local historic buildings and monuments have been identified. As a result of such survey, and strong local efforts, many significant structures have been preserved and the economic benefits returned to the States as well as the local communities.³⁵ However, much more needs to be done. Surveys of structures, as well as archaeological sites and landscapes will be assisted by greater efforts in public education (see below and *Chapter 6: Public Education*).

Landscapes

Only a few States have made a concerted effort to survey their prehistoric and historic landscapes; in general, the States' approaches to landscape issues are very uneven. Many States have active programs in rural landscape preservation,³⁶ yet few of the SHPOs have experts in historic landscapes. **The Federal Government could provide support for regional environmental and cultural resource preservation centers that would focus much of their effort on landscapes.** As suggested earlier in this chapter, such regional centers, perhaps managed by a consortium of regional universities, could significantly enhance the States' ability to identify and preserve historic cultural and designed landscapes.

State Records

Because of their importance to the State context, State administrative records, maps, photographs, surveys, studies, and other archival materials require proper handling and treatment.

³⁴Michigan underwater resources are owned by the State, but managed by the Federal Government.

³⁵See Thomas D. Bever, "The Economic Benefits of Historic Preservation," Heritage Conservation and Recreation Service, U.S. Department of the Interior, May 1978. See also, National Trust for Historic Preservation, *Built to Last* (Washington, DC: Massachusetts Department of Community Affairs and the Preservation Press, 1977).

³⁶As previously mentioned, Ohio, Massachusetts, and New Mexico all have active landscape programs.

State professional archivists and historians need training and other support to learn to apply the latest technological developments for archival procedures, including temperature and humidity control systems and conservation techniques. The Federal Government could aid this effort at small marginal cost by making such Federal training available for qualified State personnel.

Technology Sharing

The 1980 Amendments to the National Historic Preservation Act stipulated greater coordination and streamlining of operations in the SHPOs. Many States have attempted to use computer technology to improve their preservation efforts and to achieve better interdisciplinary interaction. For the States, improved planning has been tied to receipt of HPF monies. In this time of dwindling Administration support for State and local preservation activities (see figure 4), the States and localities might benefit from more aggressively studying the potential of new technologies that can help them meet their preservation goals. However, the States will need continued Federal funding for preservation in order to be able to apply cost-effective and useful technologies. Until they have such funding, they will continue to depend on the Federal Government for technical assistance.

Technology sharing can be arranged through various kinds of agreements (cooperative agreement, memo of understanding) between Federal agencies and State or local entities. The Florida State Conservation Laboratory at Tallahassee, for example, under a cooperative agreement with NPS, is treating two pieces of artillery and a set of metal doors for Gulf Islands National Seashore.

State agencies, such as State highway departments, frequently use sophisticated technologies and equipment that would be applicable to preservation needs. State universities and local preservation institutions might profit from sharing that equipment. A major problem for State educational systems is the cost of equipment, yet one of the needs repeatedly emphasized by OTA workshop participants was a corps of preservation professionals trained in the uses of technologies. State funding for the agencies with equip-

ment could be coupled with encouragement for sharing the equipment.

Protection Laws

In States where State laws are weak on protection of prehistoric and historic sites, structures and landscapes, strengthening such laws would assist in preservation. In some States, however, strong laws are weakly enforced. In those cases, State legislatures may wish to encourage increased enforcement to prevent loss or damage to the State's heritage.³⁷

Even in situations where federally managed resources have been stolen or damaged, the assistance and involvement of the State and local communities and law enforcement personnel are essential in carrying out successful prosecution.³⁸ Thus, it is important for State and local preservationists to educate their citizens about the economic and quality of life benefits of preserving their cultural heritage.

One park manager in New York City³⁹ recommends putting people in the park as much as

³⁷Even in some communities that have experienced considerable loss of prehistoric artifacts from public lands, a majority of those who have engaged in taking them would prefer that they remain in the local community. See Paul Nickens, et al., "A Survey of Vandalism to Archaeological Resources," op. cit. ch. 5.

³⁸Brent Ward, U.S. Attorney, personal communication, August 1986.

³⁹Thomas and Paul C. Berizzi, "Prospect Park: Rebuilding the Past for the Future," *Parks and Recreation*, June 1985, pp. 24-29.

possible—using sites, structures, and landscapes for many kinds of community activities. The effect is twofold: it protects park resources, such as buildings, from graffiti and other forms of vandalism, by having people and activities there; and it invests the resources with community value, which may increase the protection of park resources when they are not in use.

Public Education

An important component of all phases of preservation, public education (see *Chapter 6: Public Education*) on the State level could be encouraged by State agencies and the universities. Traveling exhibits organized by the State museums or archives may encourage local preservation activities. Aid programs, like Ohio's "Old House Doctor Clinics" encourage citizen involvement and sophistication about preservation issues.

Local constituencies can be brought into the political process in support of cultural resources only if they know that those resources exist. Yet their support is important in helping to shape local policies to recognize and protect prehistoric and historic community assets. Information may be presented through the media or through a combination of lecturers who appear before local civic and special interest groups and onsite lectures, tours, and other public events.

THE UNIVERSITIES AND THE PRIVATE SECTOR

Preservationists within the universities and private firms play a major role in delineating and furthering the understanding of technologies for the preservation of prehistoric and historic structures, landscapes, and archaeological sites. The relevant professional societies have and should continue to take their part in developing new technologies and disseminating information about them, by emphasizing training workshops at professional meetings. All three groups would also further the quality of the preservation effort by communicating historic preservation needs to

manufacturers whose products could be adapted for application in the field.

Training

Because historic preservation is highly interdisciplinary, the quality of training becomes extremely important. A common assumption is that all preservation professionals receive the same kind of graduate training, speak the same language, or work in the same manner as, for example, civil engineers whose higher education

is more uniform. However, graduates who have entered historic preservation from a variety of university majors or programs often engage in inconsistent field practices. Graduate programs in historic preservation have generally demonstrated disappointingly little support for the assimilation of a substantive technical and scientific component. This appears to be so not only in architecture, but in archaeology and landscape architecture as well.

In the United States, archaeology is generally considered a subdiscipline of anthropology. Because of this, there has been little demand for graduate school training in advanced technologies. In the United States, the majority of graduate archaeologists do not acquire physical scientific or mathematical degrees in undergraduate colleges and universities. In Europe, however, university archaeology programs place more stress on the use of scientific techniques developed in the natural sciences and engineering.

Most underwater archaeology is possible only because of the new and advanced technologies developed for the Navy and the oil, gas, and mineral development industries. Therefore its practitioners must be well-versed in such technologies. The very few university programs dedicated to the discipline, such as those at Texas A & M University, East Carolina University, and Arizona State University recognize this dependence and train students in their use.

Current curricula in architecture, architectural history, or American studies have not been developed explicitly to address the rapid technological changes affecting the building and construction fields and, thus, may be inadequately preparing students to cope with the complexities of preserving a growing structural resource base. Few architectural schools incorporate structural materials conservation courses within their programs. The lack of emphasis on the basic sciences in historic preservation programs and the lack of attention in architecture school programs to the causes and effects of structural materials failures, are resulting in inappropriate uses of both contemporary and historic building materials, such as reinforced concrete, wood, and structural steel. Many architects are often unfamiliar with the behavior of materials under the various

stresses to which they can be subjected. For example, reinforced concrete, metals, or wood exposed to extremely moist environments present difficult preservation problems. Many, if not most, preservation program faculty elsewhere have little access to laboratory facilities and are thus unable to introduce the needed technical component into their educational process.

At least two university graduate programs are combining architecture and structural conservation with natural science and technology.

The Center for Preservation Research at the Columbia University School of Architecture

Members of Columbia's departments of mineralogy and chemistry helped found the building materials conservation laboratory, demonstrating that university scientists can be persuaded to permit the use of their own facilities and help establish laboratories for preservation purposes. The center allows students to devote 25 out of 60 program credits to science and provides a conservation laboratory for the study of building materials.

The Georgia Institute of Technology's Center for Architectural Conservation

The Center is a research, information, and design facility concerned with all aspects of technology for building conservation. Specialists at the center work in conjunction with research offices and laboratories located throughout the school's campus, including the Georgia Tech Research Corporation, and derive support from Federal and State governments, private industry, and the Institute itself. Center staff have recently begun work on several innovative projects that exploit computer technology.

Building Evaluation.—The Building Inventory Inspection Program (BIIP), undertaken in cooperation with NPS in 1982, generates and updates by means of a microcomputer structural assessment reports based on 150 elements of site, architectural, and engineering systems. Each report also provides data on public health, handicapped access, fire, and life safety. Center staff are also applying the BIIP approach to assessing the condition of National Historic Landmarks.

Information Systems.—The Cultural Resource Assistance Information Network (CRAIN) is an on-line database that will collect and deliver information on conservation professionals, testing facilities, organizations, products, etc. The network is designed to transmit technical notes and documents and will be augmented by center staff to perform specialized research beyond its scope,

Database Design.—The Census of Treated Historic Masonry Buildings, designed and programmed for NPS, is part of an international effort to identify, monitor, and evaluate protective treatments for masonry buildings. Observations of conditions will be recorded and stored every 2 to 5 years to form an easily accessed microcomputer database.

Training.—Interactive optical-disk systems will combine live-action, still photographs, text, graphics, and sound for training programs in architectural conservation.

Although the history of landscape architecture is generally taught in landscape architecture programs, few schools have emphasized in their curricula the preservation and restoration of historic landscapes, and the research, planning, and design involved. Such topics may be included as part of a design course, however, rather than as part of a course on historic landscape design. No school of landscape architecture awards a degree in the history of landscape architecture, although graduates of advanced degree programs may have been able to emphasize historic preservation in their work or theses.

Universities could usefully become involved by expanding their educational programs to include courses in historic preservation for landscape architects, historians, landscape contractors, and horticulturalists. They could also assist in developing additional educational materials for gardeners and maintenance personnel. University programs are excellent places to explore the use of advanced technology for training and educational purposes.

In spite of shortages in both human and financial resources, preservationists would benefit from working more closely with scientists in the university setting to achieve a more well-rounded and balanced approach to technical training.

They could, in addition, create a "market awareness" concerning historic preservation. If faculties of history, American studies, or architecture could be convinced that there is genuine interest in historic preservation, they would integrate it as a major subject within their departments. Some programs, like the American Studies Program at George Washington University, have begun such integration. Also the American Studies curriculum at Notre Dame focuses on tangible cultural resources.⁴⁰ But technological approaches are generally not stressed in those programs.

Currently, any graduate student wishing to pursue a more technically and scientifically oriented focus in historic preservation must be highly motivated in "putting together pieces" or tailoring specially designed programs with the approval of a supportive faculty. The professional societies supportive of the goals of prehistoric and historic preservation could do more to foster research and support those historic preservation programs in need of technical and scientific strengthening.

For example, the efforts of the National Association of Corrosion Engineers have led to the establishment of university laboratories, whose research can assist in preserving metal structures. The Masonry Research Institute Foundation has provided seed money for the study of historic masonry buildings. The National Institute of Conservation has funded both Columbia University and the University of Florida to enhance materials conservation curricula. Also, the Association for Preservation Technology, through its *Bulletin*, newsletter, books, and monographs, and the publishers of the *Old House Journal* and *Technology and Conservation* have for some time been sharing technology by disseminating information.

The National Trust for Historic Preservation, as a partially private organization and a conservator of historic properties, could advance and sponsor technical education and research. Students interested in the sciences will avoid masters degree programs in historic preservation if starting salaries in the field remain as low as they have

⁴⁰Thomas J. Schlereth, "Historians and Material Culture," *OAH Newsletter* 13, 1985, pp. 3-5.

been. The National Trust and professional societies could assist in locating funding to attract students with undergraduate degrees in such important subjects as structural engineering, metallurgy, and microbiology to the field of historic preservation. The number of students with scientific educational backgrounds entering such preservation programs has been small.

Training of Craftspeople

There are not enough skilled restoration craft specialists to meet the increasing demand for their services.⁴¹ Neither are there enough architects, structural engineers, and contractors knowledgeable of restoration craft techniques or their proper execution and application. Training programs such as RESTORE in New York are designed to give craftsmen, the “men and women on the scaffold” the opportunity to upgrade restoration skills and acquire new ones. They also acquaint architects, structural engineers, and contractors with preservation issues and state-of-the-art maintenance and restoration of historic building materials,

RESTORE attempts to return to craftsmen the decisionmaking capability that has been gradually and systematically denied them by the construction and building industries over the last few decades. Craftsmanship has been sacrificed to uniformity, mass-production, and economy. Restoration is challenging, varied, and often difficult. Every practitioner involved in structural restoration and rehabilitation should comprehend the behavior of materials and their basic physical and chemical properties. As preservation activities continue to increase in the United States, more training programs such as RESTORE will be needed.

Business and Industrial Contributions to Preservation

The industrial and business communities' contributions to many preservation projects have been strong. The effort to provide private fund-

ing for the restoration of the Statue of Liberty is an outstanding example of such contributions. The project captured the public's attention; enhanced enthusiasm for historic preservation nationwide; and, perhaps most importantly, generated an enormous amount of private sector financial, material, and technical support. It also demonstrated the necessity for understanding and applying the latest technology in historic preservation. The restoration represents a timely opportunity for the preservation community to forge closer ties with industry and business.

Many businesses, especially those involved in land development or extraction of natural resources, contribute to preservation by paying for cultural resources surveys, or for excavation or mitigation of damage to archaeological resources. For example, in developing its carbon dioxide wells and pipeline in the Four Corners area of the Southwest, the Shell-Cortez Pipeline Corp. recently paid \$600,000 for archaeological work, which was 3 percent of its total investment in the area. Its work resulted in significant information concerning early Navajo occupation in the San Juan Basin, and of early Spanish occupation of the Rio Grande Valley.⁴²

Promoting Technology Transfer

As noted in several chapters, the transfer of technology from the natural sciences and engineering to preservation is one of the most important considerations in creating new methods, techniques, and equipment for the preservation field. Federal agencies, State, and local governments, the universities and industry and the business community all have a part to play in the transfer.

Public/private partnerships in specific projects can be extremely fruitful in promoting technology transfer. For example, underwater archaeologists might pursue agencies such as the U.S. Navy more assiduously to ascertain the possibilities of joining routine mapping projects or training and practice missions in diving. The Navy is often very appreciative of archaeological exper-

⁴¹ Even West Germany, which has a long history of training for craft specialists, is experiencing a shortage of artisans and other craftsmen capable of carrying out preservation tasks. Günter Schelling, Bavarian Administration for Palaces, Gardens, and Lakes, personal communication, 1985.

⁴² Al Ruthann Knudson, Woodward Clyde Associates, personal communication, 1986.

tise. The Navy's Submarine Development Group runs unmanned deepwater submersibles with excellent side-scan sonar capability to depths of nearly 20,000 feet. The group's charter obligates it to support and aid civilian scientists, such as geologists from the institutions of oceanography. Underwater archaeologists could identify and take advantage of such opportunities.

Within the private sector, a number of formal and informal opportunities for encouraging interchange of ideas leading to the transfer of specific techniques, methods, and equipment are available. Box E provides an example of such interchange for underwater archaeology and maritime preservation.

Professional organizations (table 19) provide excellent forums for sharing research, including research methods and techniques through annual meetings, publications, and special seminars and workshops. To promote technology transfer, it is important that such meetings provide for natural scientists and engineers to interact with members of the preservation community.

The Society for Archaeological Sciences has the unusual distinction of being founded in 1977 specifically to encourage interdisciplinary studies among archaeologists and their colleagues in the natural sciences. Its membership includes chemists, physicists, geographers, geologists, paleobiologists, paleobotanists, and archaeologists. Chance interactions of archaeologists and natural scientists can be highly effective in isolated cases. However, more effective technology transfer re-

Table 19.—U.S. Professional Societies With an Interest in Prehistoric or Historic Preservation

American Anthropological Association
American Association for State and Local History
American Folklore Society
American Institute of Architects
American Institute for Conservation of Historic and Artistic Works
American Society for Conservation Archaeology
American Society of Landscape Architects
Archaeological Institute of America
Association for Field Archaeology
Association for Preservation Technology
Conference on Underwater Archaeology
Council on America's Military Past (CAMP)
Historic Landscape Alliance ^a
National Association for State Archaeologists
National Conference of State Historic Preservation Officers
National Institute for the Conservation of Cultural Property, Inc.
National Trust for Historic Preservation ^a
Society for American Archaeology ^a
Society for Archaeological Sciences
Society for Historical Archaeology
Society of Architectural Historians
Society of Professional Archeologists

^aNot a professional society, but has many professionals as members.
^bSee David J. Meltzer, Don D. Fowler, and Jeremy A. Sabloff (eds.), *American Archaeology Past and Future* (Washington, DC: Smithsonian Institution Press, 1986).

SOURCE: Office of Technology Assessment.

quires coordination in institutionalizing and improving the contribution of archaeological sciences to the preservation of cultural resources.

Finally, professional publications, especially those that encourage interdisciplinary articles can facilitate information exchange, as can reviews of books on preservation knowledge and techniques.

COSTS

Many traditional activities associated with prehistoric and historic preservation are extremely labor-intensive, but in some cases, new techniques will reduce labor costs. Many new technologies require the use of expensive new equipment and the services of highly trained personnel. For example, the new and innovative technologies for locating and analyzing submerged sites, developed primarily for application by the U.S.

Navy and the oil, gas, and mineral exploration industries, are versatile, sophisticated, and also particularly costly (see box F). It has, therefore, not always been possible for preservationists to achieve overall cost reductions. Yet, these and other advanced technologies, such as neutron-gamma ray inspection, and remote sensing from space have provided useful information not otherwise obtainable.

Box E.—Private Sector Contributions to Underwater Archaeology and Maritime Preservation

- The *industrial component of the private sector*, mainly the oil, gas, and mineral exploration companies testing and drilling offshore have, for years, used specially engineered instruments, tailored to their requirements to locate deposits under the seabed and to repair underwater rigging platforms. These industries have demanded state-of-the-art remote sensing and remotely operated deepwater submersible craft technologies, many of which eventually find their way into archaeology.
- The *commercial segment of the private sector* is represented by about 25 commercial salvagers who operate primarily off the coasts of Florida and Texas.¹ Their work represents the greatest threat to the integrity and long-term preservation of underwater archaeological sites.
- The *research segment of the private sector* is represented by the various oceanographic institutions (see table) whose work and projects often touch on underwater archaeological concerns. Many receive significant funding from the Federal Government, chiefly, the Navy.

¹*Fact Sheet*, the Society for Historical Archaeology, Advisory Council on Underwater Archaeology, Washington, DC.

Major Oceanographic Institutions

Duke University	Texas A&M University	University of Rhode Island
Johns Hopkins University	University of Alaska	University of Southern California
Lamont Doherty Geological Observatory	University of Georgia	University of Washington
Oregon State University	University of Hawaii	Woods Hole Oceanographic institution
Scripps Institution of Oceanography		

Box F.—Costs for Underwater Archaeology

In underwater archaeology, costs will remain high, probably for some time, although certain locational technologies for underwater archaeology, such as LORAN, have dropped considerably. A LORAN system only a few years ago cost about \$10,000. It is now easily available for about \$600. While some possibilities for technological cost reductions exist, the current price of doing business in the field is formidable. Only the magnetometer, which costs about \$15,000, is within the range of the average underwater archaeological budget. The sub-bottom profiler and side-scan sonar each cost about \$35,000—or about \$8,000 per month to lease. Even when some technologies are combined for maximum value and efficiency, their costs are prohibitive, almost 95 percent of the typical underwater archaeological project budget. Boats at least 30 feet long are necessary for deploying remote sensing instruments. They are expensive to charter, dock, fuel, and insure. Electronic positioning systems are far more accurate and efficient than hand-held compasses. A reliable system such as the Motorola Mini-Ranger costs about \$25,000 to purchase and approximately \$5,000 per month to rent. These figures represent common, reasonable monthly expenses for a properly equipped boat, about \$33,000 per month not including costs of boat, crew, instrument maintenance, living expenses, and contingencies.

A total cost of about \$25,000 to \$50,000 per month, depending on whether or not equipment is leased or purchased, represents a believable figure for initiating field work. When that is multiplied by 2 or 3 months, the length of many project seasons, costs become the primary concern. Even the least expensive of the new remotely operated vehicles cost about \$30,000. Large vehicles to which specialized modular work packages attach, may cost as much as \$1 million or more but can combine the attributes and capabilities of several machines.

The preservation community must more systematically and effectively quantify and communicate the benefits and costs of historic preservation to policy makers at all governmental levels. There have been isolated attempts to do so, most notably by the National Park Service, which has kept various statistics since 1976 on rehabilitations to historic structures completed under the preservation tax incentives program.⁴³ The National Institute for the Conservation of Cultural Property, Inc., with funding from the Design Arts Program of the National Endowment of the Arts, recently published survey findings that attempt to quantify the scope of the Nation's requirements in building conservation. The study provides information for both Congress and private foundations.⁴⁴

It is essential, however, that the Federal Government establish an ongoing, consistent approach to gathering, analyzing, and updating cost/benefit statistics from both the public and private sectors within a central coordinating agency, such as the Department of the Interior or the National Trust for Historic Preservation.

Reducing the overall expense of any historic preservation project requires more knowledge of the capabilities and costs of new technologies. However, some of these costs are not well known or easy to obtain, particularly by cultural resource managers whose need for a greater sense of possible future cost reductions is critical. It is also important that there be central coordination for disseminating information concerning appropriate and expected costs.

For example, the computers used in conjunction with remote sensing technologies are becoming cheaper to manufacture and install as they become more powerful; thus, more and more data can be processed at less cost. For archaeological and landscapes studies, photographic interpretation from aerial photographs usually costs about \$2.40 per acre. The costs of a recent NASA/

NSF project, using advanced sensors from space and on aircraft, are closer to \$0.001 per acre.⁴⁵

Advanced technologies especially benefit the research phases of survey, site identification, and sampling because gathering as much information as possible prior to excavation or detailed site analysis can cut costs. The consultation of records and documentation, such as photographs, maps, and earlier surveys, is especially important in reducing costs as well.

Although the use of new technologies might provide important cost benefits, certain relatively simple technologies are, and will continue to be, effective and economical to apply. On the other hand, if new technologies are not used, installed, maintained, or understood properly, loss of the resource can result. Also, technologies that can be understood, operated, and maintained only by highly trained technicians might have little utility in the field.

Regular Maintenance May Reduce Overall Costs

In many cases, cyclical maintenance properly carried out ultimately provides the greatest cost benefit with respect to the preservation of historic structures and landscapes. One example of loss of a designated historic structure through lack of scheduled maintenance involves the gantry used to prepare the first successful U.S. satellite, the Explorer 1. The structure is scheduled for demolition, having suffered severe deterioration from a highly corrosive coastal atmosphere. At this point, \$1.2 million must be spent to repair it; \$70,000 per year would be necessary to maintain it thereafter. The gantry had not been painted or otherwise protectively treated for 15 years. Had a regular maintenance program been adopted, the gantry could have been kept structurally sound for only \$15,000 per year.⁴⁶

Costs and Economic Values

Important distinctions must be made between cost and value with respect to historic structural

⁴³Tax Policy and Administration: Historic Preservation Tax Incentives, ' GAO/GGD-86-1 12FS (Washington, DC: General Accounting Office, August 1986).

⁴⁴*Historic Buildings: A Study on the Magnitude Of Architectural Conservation Needs in America* (Washington DC: National Institute for the Conservation of Cultural Property, Inc., 1984).

⁴⁵Thomas Sever, National Aeronautics and Space Administration, personal communication, 1986.

⁴⁶*Space World*, May 1986.

preservation. For example, the tax incentives available through the Tax Reform Act of 1976, the Revenue Act of 1978, and the Economic Recovery Tax Act of 1981, as amended, have increased the value, but not the costs, associated with rehabilitation of qualifying older buildings. These incentives, however, do not encourage developers to extend the lives of their improvements beyond 5 years. As long as the preservation tax incentives exist, historic structural rehabilitation and restoration in the private sector will continue in spite of certain high-cost items.

in identifying and evaluating the significance of older structures, adequate research involving documents and computer databases firmly establishes the role of a structure within its historic context and increases overall project value, but adds very little to its costs. Advances in computerizing historic preservation databases will eventually reduce research costs.

In evaluating the physical condition of historic structures, accurate assessments prevent costly mistakes, which can easily result from inappropriate, ineffective, and destructive treatments. New technologies are enabling much better diagnosis of structural soundness and can reveal the more subtle or hidden consequences of past preservative actions. While these evaluative techniques may be expensive, their use can mean considerable total project savings.

Recent analyses on "embodied energy" demonstrate how the costs of older buildings expressed in British thermal units (Btu) can justify their continued existence, proving them to be assets far too valuable to destroy. A Department of Energy study⁴⁷ showed that in 1967, rehabilitating a structure required only 49,000 Btu per square foot, compared to 65,200 Btu to build the same structure new.

A study sponsored by the Advisory Council on Historic Preservation, using the embodied energy concept, showed that a 1934 housing complex in Indianapolis, should not be razed.⁴⁸ It offered

⁴⁷Richard G. Stein and Associates, "Energy Use for Building Construction," Center for Advanced Computation, University of Illinois at Champaign-Urbana, no date.

⁴⁸*Assessing the Energy Conservation Benefits of Historic Preservation* (Washington DC: Advisory Council on Historic Preservation, 1979).

a more practical approach toward arguing against the destruction of older buildings. Btu represent for preservationists a potentially powerful tool for deriving qualitative measures of absolute structural value. Some preservationists assert that it should be possible to bank Btu as credits to encourage developers to weigh the costs associated with investing in retaining old structures against demolishing them and erecting new ones.

Reducing Costs in the Marketplace

Suppliers of systems and products must be able to perceive a more substantial market within historic preservation. Preservationists at times have successfully defined and quantified the market for manufacturers, most effectively through the Preservation Tax Incentives Program. The Secretary of the Interior's Standards for Rehabilitation, developed within that program, have communicated to product developers and manufacturers as well as architects and engineers what treatments and techniques are and are not acceptable for the purposes of certification.

As a result, the window manufacturing industry is designing systems that are compatible with historic structures and mini-industries for historic window repair are flourishing. However, only a concerted effort by the various elements within the preservation community to publicize their needs to the business and manufacturing community will achieve greater progress in lowering the high costs of research, development, and production of new conservation technologies.

Developing Additional Support for Preservation

One example of an extremely well-planned funding acquisition strategy from which the preservation community could draw important lessons is being developed for highway research. The Transportation Research Board found that between now and the end of the century there would be a requirement for around \$400 billion for highway and bridge construction and upkeep and a vastly improved research effort. The board, with support from the Federal Highway Administration, completed a report entitled "America's Highways—The Search for Innovation," which

was widely publicized. On the basis of this report, The American Association of State Highway and Transportation Officials started planning the Strategic Highway Research Program which is to be funded at a level of about \$30 million per year

for 5 years through a set-aside of 25 percent of the \$0.05 Federal gasoline tax. At this point the project seems likely to proceed. Preservationists cannot only learn from such an effort but participate in it as well.